

2019 HiMCM Problem A: Charge!

In our school and social lives we exist in a mobile electronic world. Each day we "plug in" and charge our electronic devices and equipment. These electronics may range from small items (cell phones) to large items (electric vehicles). While in our own home, our family is most likely responsible for purchasing the charging equipment, and then paying an electric company/provider for the electricity we use.

Public places are continually expanding the availability of electrical outlets, charging stations, and even electric vehicle charging parking spots. For example, many airports have recently refurbished their parking lots, terminals, and aircraft to allow for electrical charging of everything from portable devices to vehicles. In some locations, these charging ports require a fee, but many public places worldwide offer charging for "free." But, what is the impact of "plugging in" our electronics at these "free" charging sites in public places such as airports, railway terminals, schools, libraries, shopping malls, coffee shops, and offices? And, who pays for it?

1. Discuss how has this type of energy consumption has changed over recent years and how it will continue to change. Identify impacts on, and requirements of, public places with these increasing energy (electricity) and charging demands.
2. Use your identified impacts and requirements to develop a model for the resulting costs of the increased demands and energy usage on public places. Discuss the extent of these costs and how they are paid.
3. Discuss how your model changes, if at all, for different types of public places (e.g. a school vs. a café/coffee shop vs. an airport vs. a shopping mall, etc.)?
4. What initiatives should be explored to reduce the cost of this increased energy usage in public places? How would implementation of these initiatives adjust your cost model?
5. Write a one-page article for your school newspaper describing your findings and recommendations.

Your submission should consist of:

- One-page Summary Sheet.
- Table of Contents.
- One-page Article.
- Your solution of no more than 20 pages, for a maximum of 23 pages with your summary, table of contents, and article.

Note: Reference List and any appendices do not count toward the page limit and should appear after your completed solution.